

Group C  
 Western Regional Water Needs Assessment  
 Salt Lake City, Utah  
 January 10-11  
 Facilitator Marie Garcia  
 Notetaker Terry Wilson

<b>Name</b>	<b>Company</b>	<b>Interests</b>	<b>Initials</b>
Lance Elias	PPL Energy Plus	Marketing affiliate of PPL. Montana Power Company was purchased. He is a resource coordinator—in between power and marketing people. Maintenance and river flow specialist-coal strip in Eastern Montana. Many facilities. Hydro and power. Licenses administration for the various river systems with which they are associated.	LE
Bill Kubik	Plymouth Tube Co.	Build tubing for condensers. Interested in water quality and where water resources are going. Trying to give solutions now. Knows materials, water chemistry	BK
Eric Mills	Utah Division of Water Resources	Arrived late.	EM
Robert Richards	RIM Environmental	Not Present	RR
John F. Sullivan	Salt River Project	Assoc. General manager. Oversees all. 13,000 square miles of water shed. 80% of water is delivered to muni purposes. In the 80's it was Ag purposes. Owns and operates a power plant. He is an EE engineer. On the power side of the business	JS
Susan Innis	Western Resource Advocates	Marketing Director policies and programs for RE-exp in Wind power	SI
Dave Iadarola	Aquasan Network Inc.	Not Present	DI
Melissa Chan	NETL	Idea of general concerns in the West. Fossil Energy issues out to the next 25 years. Climate change impact on water availability. Cooling technology in recovered water	MC

Megan Castle	Colorado Office of Energy Management and Conservation	Communications as well as program work. Here in place of new director.	Megan
Paul Drury	ERO Resources Corp.	Not Present	PD
Robert C. Wilkinson	University of California, Santa Barbara	Not Present	RW
Robin L. Newmark	LANL	Water and environmental. Program leader/ geophysics background-subsurface and water exchange issues.	RN
Susan Beattie	Nez Perce Tribe	Water Quality specialties/geology and hydrology-Federal and Hydro power to facilitate the tribe in program management and development	SB
Jerry Brown	Contra Costa Water District	Water supplier to 500 thousand people in Bay area. Server 30% of water supply to refineries and power producers along the San Joaquin River.	JB
Paul Measeles	OR Dept of Agriculture	Water quality Hydrologist.	Measeles
Val Frenchel	Kennedy/Jenks Consultants	Engineering and Scientific consultants in 7 western states/water and waste water treatment supply- salination issues. Used to be a chief engineer with a water power plant. Major GE power plant and equipment manufacturer	Val
Katie Shulte Joung	California Urban Water Conservation Council	Program director of non-profit organization to manage water research projects—new policy and new directions	KJ
Jim Lozier	CH2M Hill	Not Present	JL
Geoffrey Thyne	Colorado School of Mines	Professor of Hydrology. Prior to CO Sch of Mines was with ARCO. Water Chemist—geochemist/geologist. Petroleum production and impact on water resources. State agency connection/managing DOE funded project of water treatment of Coal Bed methane produced waters. How to re-use it.	GT
Larry Winter	National Center for Atmospheric Research	Dept Director—Sr. Scientist in	LW

		the Math Dept—formerly of Los Alamos. Chair of board of national Ecological outlook	
Tim Wagner	Sierra Club	Not Present	TW
Mirka Della Cava	LBNL	Lab participant. Provide Economic analysis.	Mirka
John E. Thorson	CA Public Utilities	Adm Law judge. New Mexican Hears water related cases and do rule making for water and energy alternative dispute program	JT
Michael Peirsol	Offshore Ports	(Laryngitis and cannot speak much)	

## Problems

Missing 7 people but let's get started. 6 people haven't signed it.

This workshop has the most attendance. Great qualifications in this room.

You are the experts. Your job is to provide information. Please take side conversations outside. Please refer to packet information. This is our structure.

Anyone who will not be here tomorrow? No. Please complete survey if you leave early.

At the end of each day there will be presentations made. Will ask later today, we will choose someone to do so. –Could be the same or different person each day.

Any starting questions? No.

First set of questions to address: Our job is to answer the questions on the matrix.

The problem area of energy supply and how water will be a limiting factor in the issue of energy production. How is water going to impact the production of those kinds of energy? We won't worry about the long term/short term frames of references. We will ask for references, please provide them.

Do we need to talk a bit to warm up? Anything to throw out

- Can you give us an example to get us started?

One of the things in the West would be the produced water from oil and gas and the issues related to that. Cost associated with it, if it could be utilized for purposes presently used for fresh water.

- Blue water technologies has a technology that mines use with a very small footprint. The water comes out very clean—Newmont Mine Company uses this technology. Largest mine in Nevada.

- More economical to use Blue mountain technique.

- Presently has a project with Shell to treat produced water—recycling water pilot in progress and cost effects being studied. Some info available from their consultants website.

- We are jumping to solutions now.

- Water problems as they impact energy production. What are those problems?

### *1. Extraction*

- The mix of energy production is going toward unconventional resources and unconventional resources have associated water prod problems that are not like traditional oil problems. Re-injected water as a stimulant for further production. Interesting legal implications in that water does not fall under normal regulatory guidelines.

-In terms of Tight Gas, it may produce less water than traditional oil processes. Produced in areas that are unpopulated or low population densities. Quality can be even better than drinking water but not appropriate for agricultural applications—too much sodium content. If you look at where the water is produced versus where the people are, lots of water produced of unclear quality, where there aren't very many people to use it. Julesberg basin, urban sprawl impacting the water supply. Don't want to increase well density in areas where urban populations are settling. Most fall under a state board in NM. Colorado or Utah—there is a disconnect in terms of formulating policy. Powder River basin water extracted from coal bed.

- Refineries say we don't want that (produced) water because it is an unreliable source.

- hopefully Energy Company would be interested if there was a reliable source

- Companies shy away from partnering with entities that aren't there for the long term.

- Alternative use of water for consumption

The water utility district is not going to be interested in the partnership

- One of the things about this region, if you examine the CO river basin, there is a huge issue of how water is allocated between allocation between upper and lower basin. It has been over allocated.

- Is there a study to determine if it is connected?

- No real good basin scale models with petroleum production intervals exists. Potentially a non-consumptive use.

- It depends on what kind of water it is

- Tributary or not? If it is connected, then there are prior rights.

In Oregon the State has to determine it.

- not buying water because it is not reliable and it is not cost effective Why? Because the quality can vary significantly. Can't count on it as a source. Not cost effective to build a facility to treat it.

Any data supporting this? Yes, there are all kinds of numbers for how much it costs for re-cycled and de-salinated water.

- What about banking or transfers? Opportunities in CA are different because you can make a trade hundreds of miles away. Big delivery system.

- no infrastructure in the rest of the west besides CA.

- Costs between 15 and 40 cents a barrel to treat water in the Powder River Basin to standards? What standards? Much passes EPA drinking water but treating it for other uses is harder

300 to 600 dollars per acre feet in SO Ca

- Different Twist: what is the definition of extraction? Extraction of the fuel source. Energy is anything that produces heat.

- Why are we focusing on extracting that specific resource?

- cannot ignore extraction because they will be around for a long time.  
We can look at RE and other alternative sources like Biofuels

- Bio fuel crop is different than a mining extraction process. The distinction of crops as a renewable source.

- the connection is, you are using water.

- the water is put back into the cycle.

The group needs to make this distinction. Yes plants do consume the water just as coals plants burn it.

- Are we talking about water for energy supply, not water from energy supply.

We need in many cases water to produce energy.

- can it be used to replace what you use fresh water for now. New fresh water could be applied to making more energy.

-the production of electricity is probably driven as much by location of resource as it is by location of water.

We are jumping back and forth between solutions and problems. They are connected but we must separate

- Not every energy source has the same problem.

- there will be continued exploration and development of traditional sources. Water that is co-produced that is not used. You could argue, it is creating more water. Energy production activities impact local water supplies in terms of contamination. Oil and gas wells specifically because of increase density.-- Impacting direct drinking supplies. Energy Companies do not build these factors into their cost functions.

- The tool is in place to make that change—to developing long term business plans.

- Is there is more interest in this? Yes.

I'd like to address a question. Is water a limiting factor for the extraction of coal oil and gas?

-No water itself is not a limiting factor but environmental damage is the limiting factor. More and more fines being levied.

- increase the fines in order of magnitude.

- one of the constraints is the water available for slurry production.

- only one power plant involved in slurry production which is now off line. If you use water to convey the fuel, yes that is a problem, but there is only one plant in the country

Oil Shale—can you go to new sources because of the issues?

- All the power plants they will have to build to heat up the shale to liquefy it.

- Example, ten applicants for leases in Western CO, all used insite heating to pull down and let water come back up when they are done. Uses 4 barrels of water for every barrel of oil. Not feasible. The key is where to you get the energy to heat up the shale. Haven't heard any discussion about this.

Let's make a parking lot for other issues:

Oil shale is a parking lot issue.

- big show stopper is the water problem for the oil shale process. Water quality and quantity out in the area where the oil shale is located. Generating enough energy to process the shale

- water is probably already connected to the CO river systems.

- Declared tributary water within any definition. Ecological issues when the water is drained down.

## *2. Fuel Production*

- Oil Refinery wants potable water back-up- we want back up use of water. Capacity allocation, a ready standby supply in case the re-cycled water goes out of spec or ceases to exist. This is an industrial standard. Making a million dollars a day and don't want to stop. Can be up to 10% system wide demand can be up as much as 10%. Can be a big hit—must have the capacity to facilitate that.

Is it a limiting factor for fuel production?

- assuming bio fuels are not extraction, Ethanol plant isn't receiving feed stock from local but water supply is local. Direct competition for biofuel but at the same time this impacts agriculture in the local area. Feed stock from Midwest but no local ag feedstock. Causes more direct impact on local agriculture.

Drawing down local water but the benefit is negative to the local agriculture.

How is water allocated to begin with? Not sure if they are buying existing water rights.

- Ag is selling water rights. But this could end up destroying the agricultural industry.

- non-consumptive uses of water for water refineries is for cooling. Finger pointing for the decline of small fish used to determine the health of the river system. They get nervous about the decline of this fish. Prove they are not the source of the damage. What is the smelt status?

you could change the name to Silvery Minnow. Temperature of the discharge and timing of the discharge.

- Timing refers to how long do they take before putting the water taken out back –is it disruptive of fish spawning, etc.

- Gets into the competing uses issue.
- In CO AZ Utah a lot of demand for muni water use that comes down to water flowing to the highest dollars. Some munis in Nevada will purchase water for \$50K per acre foot.
- driven by economics, the technology would be used if it was economical. Economics drives many issues. Change the playing field with fines, etc.
- depends on where you are for water availability for any of these purposes. Each western state has its own laws; they are similar but are distinctly different. Judge Thorson has experienced many versions of this. Huge issue with water use. If you are a single company, we don't care in AZ what the CO laws are; you are going to follow AZ law.
- water issues are very specific to individual systems and trying to understand each shed can be daunting.
- Every watershed in the West is already over allocated, over appropriated.
- has water been adjudicated?
- CA is the most adjudicated state.
- Disagree. Wyoming and one watershed presently an issue. CO has the most documented water rights case in history.
- Could there be some God to adjudicate water.

### *3. Electricity production:*

*What water problems are limiting factor in electricity production?*

- Big fights over the fish being impacted by dams.
- Hydro power is not going to be growing in the US
- That's true for the big ones but for the smaller systems they are growing.
- Hydro is not going to grow as a significant contributor
- what is the sustainable supply of ground water that is available? What do you use the water for?
- small shifts seem to erase the problem; possible solution that could make the difference might be hydro plants.



- a lot of the energy production over the next 25 years is fairly predictable. Fossil fuels will still be the main source Nuclear power is where you will see the most potential change in direction. It is a wild card. It does not become 80% of our electricity supply. Over the next 25 years we can say that Coal is the next hottest source. Then gas then oil further down. There will be a water demand based on that

- Water swapping. The limiting factor isn't water, its' the transmission. For ex. Montana has a lot of water, but no way to get it out of the state.

- location is everything

- strategy is to site large power plants near sources then transmitting the power away. Can see the water being a limiting factor for the transmission of the power? For ex. Oil shale will need electrical generation for processing. Is there a water supply available to use to generate the electricity to heat the oil shale.

[Another participant joined the group] --Offshore Ports.

- Clarification of what Katie said—dozens of small dams where they were considering decommissioning. Instead they are looking at flood control, water supply, energy supply.

- Companies are re-visiting what is the current value of the various competing things this dam could supply. Dams issue is a moving target. Bing up these points as solutions.

- Energy companies are allowed to put up obstacles that prevent water purveyors from generating their own power from wind or hydro.

- Creating more efficient use of existing water is improving efficiencies of hydro plants. Get rid of fish regulations & you would have a great deal more water available.

- you could then say if we just got rid of mercury restrictions then there would be more too.

Problem is the environmental concerns with water quality and water quality concerns with the environment.

- air quality aspect to water quality. It ends up as a water quality issue but it is an air quality issue to start with

- Local communities' fight the construction of new power generating facility of any type and water leverage is the issue

- construction of new transmission lines—visual-environmental-EMS

- different perspectives of the same problem

- Fuel production generation- many want to push new power plants to reclaim water then water quality becomes an issue. If the quality changes they need to go to another source.

- or upgrade the materials

- The cycle of reclaimed water that goes to generating station is a problem to cool the energy production during peak usage times.

- Salts accumulation problem in AZ recycling opportunities are impacted by salts

A lack of infrastructure between areas of demand versus supply. No easy swapping. transmission lines

- Couldn't float the same projects now with the costs

- international water issues are a problem. Transboundary issues north and south Canada does not like US using their water for power production.

Both borders (Mexico)

- environmental impact of water cooling discharge

#### *4. Renewables*

What water issues as they relate to renewable energy

- is it extraction or not. For example for biofuel production are you creating a renewable crop and using water that is not a renewable source

- Dry land farming does not require irrigation How about using canola as a crop rotation with wheat.

- Crop dependent.

Dry fallow growing system.

- dependent upon weather, prices, the market, many other variables to support the business aspect of renewable crops.

- crop failure could make the biofuel sector fall apart.

- climate change is very real – more precipitation but warmer temperatures that impact dependability.

- higher temp, higher evaporation

- geothermal twist is to inject water into hot dry rock to fracture it. Most geothermal locations are in hot dry places. DOE is pushing this technology a definite water use problem putting strain on infrastructure and water allocation
- hydrogen development, is it a direct use? How much water does hydrogen development take?
- It depends upon how you split the atom.
- two camps for hydrogen-- one can do it with natural gas or take water and use renewable source such as wind and split it that way. One way uses more water than the other.
- for many of RE technologies there are no water issues.
- in the bigger picture you may need water for the support for wind generating.
- the problem is the dependability of alternate sources such as RE.
- solar hydrogen system backs up one another.

Break for lunch

[Participant arrived after lunch]

- develop and plan for resources

Wrap up problem related to water and Renewables?

- spoke with [Participant] over lunch: structure in Ocean OTEC supply energy through the ocean. Sees the ocean as a solution to water issues.

Anything else about water?

- water quality is still an issue—still-- there are pesticides, thermal issues.

## **Water Supply**

Identify what are the problems for urban use related to impacts on surface water, then ground water, then economic development, etc.

### Urban Use

- storm water run-off or URBAN SOUP with all the junk from the streets, industry
- water disposal in terms of storm run-off. Millions of \$ spent on disposal and drainage system.
- Does Surface water include sea water ocean water?
- EPA has divided coastal waters into a different category.
- what is the definition of Surface water. Definition varies state to state, as do the regulatory guidelines
- Water is price at cost of service rather at the value of its use. Dis-incentive for conservation at a subsidized price.
- some urban areas don't have individual meters. Just a flat rate
- not a lot of incentive to encourage IOU to conserve. The way the financial structure is set up there is not any encouragement
- Cost value is the price the customer is paying as opposed to the value it is used to derive.
- there is no value associated with water itself.
- Every drop has already been spoken for in terms of surface water. Can't create new water in the surface supply
- if you were withdrawing fossil water and adding it to the surface cycle

The problem is a limited supply of surface water.

- there is surplus flow at times if there were facilities built to do so in some places of the West.

Not being captured and stored.

On average all of the surface water is accounted for. Base flow is allocated.

If you have a reservoir you are capturing

- rapidly increasing demand for water is a problem
- domestic use of water unregulated (ground water) a ground water well could be pulling from a surface water source

The relationship between ground water and surface water is still undefined.

- it's just plain ignored.
- protected and unprotected water. Depends upon states
- some states it is and some it isn't

Growing constraints on surface water as a result of ground water use.

Increasingly stringent regulation with regard to public health concerns

- secondary pollution issue –urban run-off waste discharge aerosol deposition from other power sources
- agricultural discharges are not regulated.
- Industry specific variance for water quality compliance is a problem

### *Urban ground water*

- unregulated withdrawals
- Underground injection control --many cities use dry wells that are still in use. Today. They don't know where they all are located. Controls not enforced
- Lack of enforcement of the regulations that already exist.
- Land subsidence—house cracks
- Lack of resource definition. The actual resource is poorly described what is.
- Lack of all kinds of data
- Lack of understanding of what defines ground water
- Growing reliance on ground water for water supply
- many munis are almost entirely dependent on ground water.
- Ground water usage without treating—no infrastructure

- elevated salinity issue emerging contaminants
- Arsenic raises its ugly head
- paving over recharge areas—impermeable surfaces.

The trend is all is getting worse and worse.

- recharge and urban settings—look at K.
- not so much getting worse but becoming better understood. EPA has done a good job to get people to delineate where the water they drink is coming from. Depends on the areas as to how progressive they are.
- Growing reliance and shrinking supply
- as more people move in the wells have to get deeper
- increasing cost in procuring water for muni supply at reasonable prices.
- as the water table goes down it costs more to lift the water out
- impact of the energy crises and all of those people getting back-up power for their pumps --moved from diesel to line power and the implication of what happens during drought when people switch on the pumps.

Lifting cost of water

Water has no intrinsic value

Economic Development for problem area water supply

- Privatization of water sources is a problem
- this is a problem? Why
- Rights to the water sources is the problem
- Once value is placed on water then there will be the privatization
- international companies coming in and buying water rights
- but all of the states have some regulation for the control of rights. So I don't see privatization as a problem

- who is the overall owner of the water who gets to decide—but if you say there isn't a value it is community property then how can you sell bottled water.

This is a wall—

- A French company owns all the water in Boise.
- In Denver economic development is tied to water supply

Limited water leads to limited growth leads to bond rating issues for munis

- one pass use regulations. Regulations preventing re-use of water. Colorado.
- injustice claimed when a big bad agency goes and steals all of the farmers water at a low price, haven't paid an adequate amount for the water as well as the economic impact of taking that water

Out-of- region water transfers

- make a deal for 100per acre foot. But the farmer hasn't considered the impact for not considering the value of the economic benefit.

Weren't compensated in an economically beneficial manner. Third party impacts that are not figured into the cost of the water.

Inter basin transfers is the larger issue.

CA depends upon the hugest inter basin transfer probably in the world.

Ground water transfers from one basin to another are illegal

- General Development is restricted unless developer can supply a source of water.

How long that supply is to last depend upon the state.

- builder/developer required to demonstrate a 100 year physical supply, not important whether you have access or not.

Unreliable water supplies in rural areas. Need to guarantee water in urban areas.

- CA no negative impacts
- some areas in AZ have this problem where they are having to haul water.

*Environment urban use*

- maintenance of protected habitat and endangered species due to reduced water and water quality
- almost nowhere
- lack of inspection re regulatory compliance
- Inefficient system—a lot of leak and wasted of water. Lose muni systems.
- aging infrastructure
- aging infrastructure is a concern in the east
- lack of understanding of true environmental impacts and being able to assign economic impacts to that.
- A need for source water protection
- well head protection programs.
- muni water supply supposed to delineate any impact to water supply of things like water being next to a interstate and a truck hits the head.
- Lack of resources to carry out the guidelines. Data gets collected but no analysis performed.
- Did homeland security bring anything to the table?
- HS is an issue that cuts across
- DHS has a lot of programs in place now that relate to water. If there is a cross agency issue, let's put it in the parking lot so that DOE is aware it was brought up --would like to see it.

#### Agricultural surface water use

- too protected and not regulated—exempt from a lot of water quality regulations and
- alteration of water courses—habitat altering. Alteration of drainage networks destruction of riparian areas.

#### Non-point source pollution



- ag water prices are so undervalued low as to devalue water. Heavily subsidized.
- is that a problem.
- Higher quality supplies and pollute the water the most heavy polluters—one of the major polluters
- Ag controls most of the water rights.
- they control long term contracts and senior water rights.

How many states have senior water rights? Most western states.

- water right abuses—a farmer adds more acreage to his holdings but the regulators haven't caught up

Illegal diversion of surface water.

*Ground water from ag use*

[The group felt all was Ditto for surface water points and urban ground water points.]

- agricultural users could take as much water as they wanted.

Right of capture

- Southern New Mexico the ag use of water going up

*Impact on economic development by ag use*

Ag. Controls all the water rights.

- In CO one time buy for rights
- buying water rights from a farmer because ground water is going down. A real sticky point
- United Water came and bought the water rights from the farmer. So now it is one private company.
- its' a balancing act between buying rights and development. Is it economic development or economic burden?
- We in Utah made a conscious decision not to go after the water because of the economic impact on those communities. 80 % of population concentrated in Salt Lake and they want it spread out.

- negative economic impact on farming communities when urban areas come in and take the water away. The communities turn to dust.

*Impact on the environment from ag use of water*

- both point and Non-point source pollution. Re CAFO
- contributes positively and negatively to the recharge
- Overgrazing that leads to erosion

Ag use is primarily consumptive use.

- Ag use alters the water balance.
- ag impact isn't as intense as human impact.
- But the areas are spatially larger

Alters water balance in most locations. May also impact on the weather—initiation of precipitation, for example.

- greenhouse effect--over fertilized areas
- Alters the surface water shed for sure. Water may have been diverted—alters stream flows and created new riparian areas perhaps.

People fighting over piping flow instead of using channels because the channels are like a stream.

Ag use dewateres the stream flows.

*Impact on surface water from energy production*

Surface water impacted by energy production

- How does for example a Hydro plant impact the surface water—it alters the flow
- Disconnect between peak need and flow—dam fills up in the winter

Larger hydro facilities

- another competitor for water.

Discharge of produced water the quality of the produced water discharged as a water quality issue.

– There are confusing regulation and ownership issues. Regarding surface and ground water of produced water.

- energy producers and generators are not plugged in.

- Do electricity generators get their water from municipal supplies?

- yes.

- Energy producers deal with whoever has the water rights in the area. Problem where they buy a farm that pumps water to produce KW hours.

- in Bay area two facilities have been built using muni water

- increases salinity in the local watershed.

#### *Energy production impact on Ground Water*

Same kinds of things as for surface

Often we are mining the ground water where surface water is, in principal, renewable. We have reduced the water supply permanently.

- Uncertainty of the amount of water available to us.

- lots of basins within the US that we know nothing about.

Need more money for hydrogeology

- If we can't define the resource, we can't define the impact.

#### *Energy production impact on Economic development as it pertains to water*

- is pricing structure different for an energy producer as for a resident?

- Each producer purifies the water to the level they need it to be.

- amount of water going to turbines is much less than the amount used for cooling

- Distributed generation using less water?

– Consider other technology for energy production that use less water.  
A lot of this is the same as what we discussed this morning.

### *Impact on the Environment*

Electricity generation impact on surface water

- A lot of what we have already covered,

### *Environmental and Recreational impact*

- Sport fisheries decline
- security issues of boats getting close to dams
- timing of flows in relation of using the water

Impact of temperature changes on habitat and basic species caused by diversions.

### *Impact on Economic Development from recreational and environmental use of water*

- Keep the stream flows up for the recreational users and the tourist economy
- Competing uses of water.
- many environmental regulations make it difficult to construct a power plant.

Problems for water and energy

Top three problems in each category

Pass out dots each person takes

Six dots on the energy side

Six dots on the water side

Red underlines indicate commonalities

F pages 1-6 are energy

F pages 7-14 are water ones

The group nominated Larry to present.

At this time everyone voted for their most important problems

## **Energy Problems**

**Unclear who owns water**

**Disconnect in formulating water policies**

**Lack of Plumbing system to Move Water Around**

**Competing uses of water**

**Economics drive all water issues**

**Electric Power Companies put up Barriers for IOUs to**

**Water quality and quantity concerns**

**Energy:**

**Water Quantity and Quality Concerns**

**Activities**

**Electric Power Generation**

**Extraction**

**Fuel production**

**Back-up for Renewables and Recycled Water Users**

**Specific Results**

**Salinity**

**Temperature**

**Chemical Composition (organic and inorganic)**

**Quantity Constraints**

**Competing Uses of Water**

**Water Flowing to the Highest Dollar**

**Water Pricing is Independent of any Intrinsic Value**

**Water is Unevenly Subsidized**

**Who Owns the Water**

**Lack of Coordination and Planning**

**Lack of Infrastructure**

**Produced Water (in relation to extraction industry) is not Included in**

**Water Resource Allocations**

**Don't Have Modern Conveyance Systems to Transport Water**

**Don't Have Legal Structure**

**Water:**

**Growing Reliance on Ground Water Supply**

**Shrinking Supply**

**Uncertain Quantity**

**Lack of Regulation Enforcement and Control**

**Link to Surface Water?**

**Paving Over Recharge Areas**

**Water Pricing is Independent of any Intrinsic Value**

**No incentive for Conservation**

**Agricultural Use Water is Subsidized**

**Inadequate Infrastructure (all scales)**

**Aging**

**Leaking Municipal Systems**

**Increased Demand for Water Generates Demand for Improvements**

**Climate Change Impacting Water Availability Timing**

**Source and Receiving Water Protection from Point and Non-Point Source Pollution**

***End of Day One***

Western Regional Workshop  
Day Two  
January 11, 2006

## **Needs Identification**

All but one participant present

Today our job is to take a look at the problems from yesterday and identify the needs. Prioritize and then come up with potential solutions to meet those needs

Many commonalities across the workshop groups. Similar sets of problems.

Let's start on the needs.

Refer to hand out for group C.

### *Energy*

Water Quantity and Quality Concerns and the Results that occurred.  
Needs under the first problem statement:

- needs are very region specific. Having difficulty thinking of broader perspective
- those needs have been somewhat defined for us on the map. It identifies the need to some degree.
- point to the projections they appear to be region specific the sub text to that is the energy mix or actual activities may need to be addressed and may be changed
- **we need an assessment of ground water resources that is cross regional.**
- Data is always lacking. Consider the site selection process and the attempt to match water quality matched with quantity. No way to get that unless you go to each company and ask them for their information. There are sources such as USGS and water management cos but not organized and coordinated with pipelines, transportation, water rights information. A major effort to get it all in one place, Information systems as well as data.
- Storeet is a poor data base—data legitimacy problems, access problems.  
A data base equivalent to a virtual national map, constantly updated on a two week basis. All information in one place. Yes there are security and proprietary issues.
- data exchange is making progress and strides but it's such a complex data set that it is a difficult process.
- Is it a mapping need? DOE would love such a task specific idea.

**Need an information system to include maps and data regarding energy systems and water availability and quality.**

- in Baltimore my group spent 20 minutes talking about data issue. Impaired water sources. Regional is so spotty. The oil and gas industry will have the deep stuff; some states will have shallow information. There is a gap at a depth intervals. Proprietary interests are a problem A national program will really help

- the national level is the only level this can be done at. There is an intermediate level where much can be stored. After treatment storage. There is a carrot for exploration of this waste disposal issue.

-We are losing some of the data stations—USGS are losing gauging systems.

Provide funding for states to maintain the data gathering job.

**Need Funding for data gathering/collection management incorporated into a national system.**

**A national system will never work, Should be on a regional basis?**

We are going backwards in terms of data gathering.

- funds provided to collect but not funding to include data

- so many proprietary reports and local variations. State laws vary, example CA well logs not available, but in CO you can look up any well report.

- Even Universities don't catalog unless you have physical access to it. University of AZ is going through a data gathering process about AZ data. An amazing wealth of data from the past they didn't even know existed.

How about on a state basis?

- **some type of National framework the states could follow.**

The need is funding and a lack of accessibility to information.

- not only funding but regulation, it must be enforced

- the data is out there but it is just being lost or isn't accessible.

- Western governors association to manage a management level

- perhaps



## Water ownership

In the west how you organize the transmission organization is from North to South. But water is completely different. How the regions are divided.

- If you want to overlay the electrical system, they don't match with the water system. The need is to have overlapping or integrated assessment. Because they are interdependent. Assessing them allows us to shed light on the resource.

- what kind of energy are you talking about?

The electric industry the way it is currently structured is dysfunctional. You cannot identify where the power is generated and where the power is going. Power plants are being built because they have cheap water and access of the grid. All intended to sell to the big black hole in CA

- an EE to set some criteria and regulation of siting.

- Can't do that until you have that information system.

- the information is there and should be comprehensive and sort able. Should include controls on major rivers, sensitive habitats, large and comprehensive data storage and retrievable. Populate the existing ones with proper information that already exists.

- The goal is to have an integrated assessment. Optimization tools we haven't talked about.

- who is going to do the assessment and how are they going to do, Who does what with it in the conduct of infrastructure planning. That is the solution

- How quickly will it become available? The gov takes so long to implement and by the time they are implemented they are useless. Think forward to what could be done quickly.

- overarching need is the national will to do this for our future.

- the developers won't wait for this information;

- yes, things will not stand still

Funding has to be significant and it has to be immediate.

- Denver is bringing all the stakeholders together to get an integrated plan. There are efforts already under way. The need is to be able to communicate with the stakeholders that can input the information in a timely fashion.

Not just the information but the approaches too.

-The divergence of opinion—academia loves information. The real world does not want all that information. The problem is quantity and quality. How does this expanded discussion relate?

- We are addressing the next bullet, actually. I have power system to run, I don't want to be filling out forms for the rest of my life.

- the funding point is important to increasing quantity and quality.

- A regional effort to identify capacity and uniform guidelines. The information in standard form.

Evaluate our current state of affairs and will it meet our future demands.

- What kinds of technologies are out there to make us more efficient so that we use less water and reduce demand over the long term. I'm still building power plants for people that want to run their energy.

- Identify areas where we can improve technology.

- identify standards like Energy Star

Water Star idea.

- Develop technologies for more efficient water use in energy producing industries. Include in that Renewables. That will play a significant role in the west.

- more broad perspective that is just part of it. Technology is just part of the issue. The higher goal is to Reduce water intensity of energy producing industries.

- lets go through the rest first and then come back to this

- if we look at this whole idea in terms of water per power generated.

Oregon's would be much different than that of the desert.

The need would be to identify water need per generation capacity as a standard.

- Create incentives for the power industry to use less energy. Need an incentive for the industry to use less. If water is cheap and free there is not incentive to conserve and improve efficiency.

- guidelines would help dictate to the county planner whether the bar is reached for a plant citing.

- we still have to identify the quantity of water available in the location that you are thinking of.
- How about CO2 credits like energy credits.
- that gets into planning and coordination.
- the water issues are shoved off. Most counties won't look at the issue.
- State citing process controlled by a commission. Water is a piece of that but one little paragraph of an inches thick document. A teeny issue of the whole picture. Power plants deal with bigger issues.

### **Identify incentive based best practices**

- Better documentation on who owns the water and how much of it they own.

Allow power plants to use water of lower quality. Develop more materials and equipments that allow this.

The need is to be able to use lower quality water for industrial purposes.

As fresh water has gotten more expensive, power plants have turned to other water. There has been the incentive. Incentives have pushed industry in the right directions

### **- Competing uses of water.**

Make the power plant also a waste treatment plant.

To be able to utilize poorer quality water.

Be able to identify uses of water. Compare the recreational use with the environmental use.

Put a value on water for various uses. Equitable rate structure for competing uses of water

- Does it make sense to combine 2 and 3? Water pricing and competing uses of water issues are combined.

What is the price they are willing to pay. How competing uses change the pricing and value of water.

- allocation so that all beneficial uses are satisfied.

- what we need is to know what each sector expects to pay for their water.
- the real world most of the water in the river systems. Some kind of pricing mechanism is mute point because there is no water to sell. We are confusing water uses. Consumptive use versus in-stream flow. Two different worlds that don't blend.
- Exercise of Cal Fed in CA first big and complex effort to identify competing needs for delta water. First time anything of this magnitude identifying an environmental account. Discourse must be local and regional.

The answer isn't what they will pay but a balance of use.

- Pricing assessment and background studies that say here is the evidence. Heads up energy plants, this is what munis are willing to pay.
- Fairly allocate water among various uses.
- the difficulty is the allocation and distribution regulations are in disarray. Mechanisms are some market based, some are regulated. We need a better allocation system.
- Companies must follow the laws
- the case in New Mexico
- one of the needs is to convince society that the water needs to be used in other ways. People need to be convinced that other uses are just as important to allocate as used
- Local or regional priorities are announced.
- we need to have a mechanism to facilitate redistribution. Public education.
- water conservation is part of the issue.
- beneficial uses is not pie in the sky.
- each state will have a different definition of beneficial use.

You need to fix the price of water. Lots of studies about this but there is not political will to do that.

Munis don't want to address price of water because of the social issues that come with delivering water.

80-85 % of cost of service is how most utilities are pricing water.

As soon as you put a price onto water you open up the door to conflicts

- a study that shows how rising water prices are going to drive up electricity prices.

An analysis of the effects of rising water costs on energy production costs and pricing

- suggested identifying uses of water verses value of water.
- -we need DOE to provide incentives to water agencies to reduce energy consumption in the production of water

### **Lack of Coordination and Planning Problem:**

Integration from page 19 goes under this one.

### **We need coordination and planning period.**

Coordination and planning of what? Water and energy use. Water energy production and use.

Water purveyors need a 5-10 year advance for energy facility siting.

What other states have a facility siting act?

### **Integrated assessment is a sub bullet**

#### **--Best practices for legal requirements for coordination and planning**

#### **--need to address conveyance systems for water and energy**

Surface water is not really an issue because it has already been allocated. It is the ground water that has the issues.

- so is there a need for
- traditionally the energy production at the fuel source then water is the second thought. There needs to be consideration on an integrated basis a factor of how the water gets there.

Include conveyance in the integration bullet.

- If you are required to look at citing and sources it may be more efficient.

Legal framework to address those issues.

It would be nice if economics could drive the decision; however the variances are requested and granted.

- if you actually consider the price of water and energy production, together, then you get better pricing.

- Co-location issues seem to be more solutions rather than needs..

JB --best practices coordinated. Coordinate any new best practices for energy with new best practices for water.

- energy researches to coordinate some of the water studies and efforts they are working on. Coordination among major R&D players. AWWA, EPRI, etc. Their agendas are not coordinated.

[Break]

### **Needs for Water:**

- discussion this morning gave us a jump start on the water problems

### **Growing reliance on ground water**

- the first issue we discussed that covered it.

**Paving over recharge areas—needs to be education/awareness of the importance of maintaining groundwater recharge to people about the problems and then identify alternatives and other ways of doing it.**

- mapping recharge resources. Are there any maps for that? Yes in CO they map hazards but no analogy for water resources.

But actual recharge areas are not mapped. **The need is to identify and map for recharge areas**

- **the need is for land use planning to consider areas of recharge and the solution would be land use planning**

- can't you identify the run-off resource that isn't used. The need it to identify potential water use resources that aren't being utilized.

- Use of Retention basins is the term.

Where does the ditch fit in hydraulic connection to the aquifer?

- more technologies for recharge and recovery

- what about the demand side of the question? Projecting the future

- serious conservation takes place when you finally recognize there isn't enough water. No real serious effort for the potential of conservation. The potential has not even been studied.

Some individual utilities have water studies.

**--need to understand the potential to reduce water consumption in utilities**

**A need for public education for both the water cycle and the ground water's role in the water cycle.**

- Do we need to address contamination issues? Arsenic, Chloride,

Evaluation of health effects of contaminants.

- disagreement on drinking water standards

Problems of contamination of ground water.

Need understand how to manage water quality limited ground water

Water Pricing is independent of any intrinsic value (see energy problem)

Ag subsidy of water use—State and federal projects.

Do we need to add a distinctive phrase for ag?

Add the fact there is no solution without considering agricultural interests

Need to include the ag community in developing solutions. A need for greater parity between water and agriculture.

Investor-Owned utilities have no incentive to encourage their customers to conserve.

Incentives to encourage ag to grow climate appropriate plants.

- a need to improve water conservation methods for ag industry and then water companies would be more interested in partnering with them.

Advancing water conserving technologies for ag and urban use.

With 50% of water use for Ag.

Inadequate Infrastructure

Need integrated study. AMCE has done a national study. Much work is currently being done.

Look at current AWWA, AMCE and GAO studies. They have all come to the conclusion that it is a big issue.

**--The need is the funding to fix the problem.**

**Everyone wants to solve their local problem independently. So the need is an integrated approach to fix the problem?**

To help the nexus, integrate across regions.

Palo Alto is a one stop shop. They are looking at other generators and because they manage the whole thing they can examine the trade-offs. They can look at co-gen options

- need to have a demonstration --

Does DOE need to have a demonstration? This is a solution.

- What do we need to fix the infrastructure? Take an inventory, prioritize the problems and then fix.

The water agencies know the problems but they don't have the money to fix it. Have a plan and then pick the ones with the greatest national interest. Key points that may be difficult for a local muni to put out a bond issue.

- regional inventories cover what systems?

BOR has done needs assessment for their infrastructure

Hundreds of small Federal reclamation projects that don't have the money to rehabilitate. Some where the water use is changing.

Prioritize opportunities to increase water efficiency through entire system and not just the end user.

Climate Change Problem

Impacts flow, snow melt

**Understand and project potential impacts of climate change on water supplies.**

Adaptation approaches Irrigation schedules that are moving for example

Need for adaptive planning, management and mitigation

Need to identify water infrastructure that would be needed under climate change scenarios



## **Source**

**Need the regulatory process to be streamlined so that regulations are implemented and enforced in a timely manner. The public must support it.**

**Need an informed and educated public about water protection and energy.**

**Need science to establish water quality standards.**

## **Solutions**

Lunch Break

Are there needs that stand out?

- need for comprehensive information systems and a complement for incentives

And public education and buy-in and overall planning.

- what you really need is the follow through, funding and support.

Goals should be a process that involves all the process we have been talking about.

The set of needs we decided to address the solutions for are:

- 1. Comprehensive info system**
- 2. Strategies for optimizing use of resources**
- 3. Planning and coordination**

The solution for comprehensive info system

Planning and coordination is a critical component and not a subset.

Three main needs narrowed down to above list

### **Comprehensive Information**

DOE should develop and maintain a comprehensive information system that includes energy and water data, including but not limited to:

- Existing energy and water database
- Validation of data
- Water ownership
- Confidence levels of data

- Groundwater availability and stream flow
- Super-Fund sites
- Brown Fields
- Impaired Water
- Landfill locations
- Point Source permits
- Power grids
- Source of fuel
- Inventory of produced waters
- etc.

DOE should fund case studies/pilot projects for programs that demonstrate multiple benefits

- Sector based programs including food, hospital consumer industrial with demonstrated water and energy savings
- Cooling tower retrofits
- Co-location of power generation/water re-use or treatment
- Innovative legal/policy issues
- New generation technology involving water efficiency as a driver
- Demonstration of new technologies that enhance energy and water efficiency
- etc.

### **Strategies for Optimizing Use of Resources**

- Promote findings of pilot projects
- Deployment of technologies coming from pilot projects
- Public education and outreach
- Integrated regional models
- Value priced water including appropriate rate structures
- Conservation promoting price structure
- Review of water subsidies
- Use of produced waters where appropriate
- Modernize and implement standards and regulations (i.e. leak detection, water quality, facility siting regulations)
- Promote conjunctive use for surface and groundwater

### **Planning and Coordination**

Develop a process for working together on regional projects including

- Research community/entities
- Local governments, i.e. Denver
- State and Federal Agencies
- Private water companies
- Energy producer
- Investor owned co-ops and municipal/tribal electric utilities

Develop an integrated assessment that includes prioritization of needs and framework from the assessment

Use integrated assessments in guiding facility siting

Incorporate future supply and demand in water and energy resources under different risk scenarios (drought, flood, earthquake, climate change, population growth)